

The Interrelation Between Test
Results in Various Phases of English.

by

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The Interrelation Between Test Results in Various Phases of English.

This study involves a total of 1477 scores made by pupils enrolled in classes of English in fourteen senior high schools of Kansas, located in fourteen different counties of the state. These pupils were enrolled during the school year of 1923-24 in second and third class cities in various parts of the state. There was no intentional selection made either in regard to pupils tested or in regard to size or location of the cities in which the scores were collected.

It is the purpose of this study to find a solution for the problem of classification of pupils who enroll in classes of English in the high school, by investigating the interrelation between the various phases of English as judged by test results in some high schools of Kansas. The high school grades, nine, ten, eleven, and twelve are included in this investigation.

English may be thought of as including, reading, composition, grammar, literature, spelling, and voca-

bulary among its phases. Some teachers of English also consider writing, debate, dramatization, etc., as phases of English. In this study only the first six mentioned will be considered because scores are not available for other phases of the subject.

The standardized tests of achievement employed for measuring results in the study were:

Thorndike-McCall Reading Test, Form A.

Nassau County Supplement of Hillegas Composition Scale.

Buckingham-Ayres Spelling Scale, List 30 words.

Thorndike Visual Vocabulary Scale.

Charter's Diagnostic Language and Grammar, Miscellaneous A.

The Emporia Literature Test (Not Standardized).

The Terman Group Mental Test, Form B.

The problem of classification has been attracting a large amount of attention among educators during the last decade, judging from the number of articles written on the subject. Some of the latest and best of these articles referred to are in an annotated bibliography on pages 288-363 of the "The Twenty-Fourth Yearbook of the National Society for the Study of Education, Part II." Others referred to were in the current educational magazines for 1925-26-27.

In his book entitled, "How to Measure in Education," W. A. McCall says: "The problem of classification of

1. McCall W. A. "Measurement in Classifying Pupils" in How to Measure in Education. pp. 15-47.

pupils once mainly solved on the basis of demonstrated or estimated achievement is now more difficult in as much as the expectation of progress is made a more prominent consideration. It is now considered not enough to group together children who are scholastically alike at the moment; those ~~who~~ should be put together who will make similar progress."

Dr. Colvin has expressed himself as agreeing with Dr. Whipple, when he contends that we must get a "psychological profile" of each individual. Dr. Colvin believes that there are special abilities that are not closely related to other abilities and for that reason an individual cannot be treated as a unit, but that he must be discovered in his various tendencies and abilities. In order to know the individual as he really is, we must work out his "psychological profile" showing his high and low points, and adapt school work accordingly. Thus the problem of classification increases in scope when one recognizes the classification concerns the present and future needs of the child.

In a study reported by Arthur I. Gates, Dr. Baldwin's proposal to take into consideration physiological matur-

1. Colvin, S. S. "The Present Status of Mental Testing." Educational Review. Nov., 1922.
2. Gates, A. I. "The Nature and Educational Significance of the Physical Status and of Mental, Physiological, Social, and Emotional Maturity." Journal of Educational Psychology, Sept., 1924

ity as well as mental maturity in classifying pupils is discussed and criticized. Dr. Gates does not entirely agree with Dr. Baldwin in his view on physiological maturity; however, out of this discussion grows Dr. Gates' suggestion of multiclassification of children enrolled in various high school subjects.

A study by S. A. Courtis quite definitely suggests for arithmetic, working out a classification within the class that will help pupils overcome special difficulties, that is, individual difficulties. Dr. Courtis shows that there is a very low correlation between speed and accuracy in solving either subtraction, multiplication or division problems; ~~thus~~ he suggests that a differentiated classification be worked out within each class that would permit extra time and treatment to the difficult phases of arithmetic for the individuals of the class. This is in accord with the stimulus-response theory of human activity, that for every response there is a certain definite stimulus. Dr. Gates states that each reaction is learned individually hence teaching must be in accordance with that fact.

Dr. Courtis says in the above mentioned study that he believes that addition, subtraction, multiplication, etc. should be considered as separate reactions and taught accordingly. It seems that classification with-

1. Courtis, S. A. "Validation of Objectives." Journal of Educational Research. Oct., 1924.
2. Gates, A. I. "Reacting Mechanisms." pp. 31-39. Psychology for Students of Education.

in the group enrolled in subjects with many phases, is one solution to the problem of special difficulties in these subjects, that is, a multiclassification such as, Dr. Gates suggests for the classification of children enrolled in various high school subjects.

So far, as the writer has found, there is no study that attempts to make for English in the senior high school, the classification which this study suggests.

The tests used in this study are all standardized tests with the exception of the Emporia Literature Test. These tests were given and scored during the school year of 1923-24 in various high schools of the state, as part of the cooperative study under the direction of Dr. F. P. O'Brien, Director of the School Service and Research Bureau of the University of Kansas. The tests were given and scored in accordance with specific written directions. To secure uniformity and accuracy those tests that were scored by the teachers in the schools were rechecked at the Bureau of School Service and Research, of the University of Kansas.

These tests were given in some of the other cities of Kansas but the records were not complete for all of the phases of English treated here, or they pertained to a different year and were not included in this study.

As the test results were secured from high schools in various parts of the state without regard to size, location, or character of population within the two types of cities, a random sampling may be assumed.

A table giving the names of the second and third class cities in which the tests were given, and the number of pupils enrolled in each grade, is given here to show the situation as to enrollment in the various cities involved in this study.

Table I. Number of Pupils Tested by Grades in the Various Cities.

Second Class Cities		Number of pupils by grades			
	IX	X	XI	XII	
Lawrence	239	240	220	170	
Chanute	220	235	180	125	
Hays	50	35	36	35	
Augusta	90	60	60	60	
Paola	95	90	80	65	
Chetopa	42	41	25	5	
Marion	40	52	45	38	
Ottawa	240	115	110	80	
Beloit	100	85	70	65	
Totals	1105	953	826	643	
Third Class Cities		Number of pupils by grades			
Glasco	42	34	45	30	
Little River	31	20	17	11	
Bucklin	45	35	30	34	
Coldwater	40	35	35	34	
Lovewell	24	10	15	26	
Totals	182	134	142	135	

The above table shows the distribution of pupils in the various cities from which scores were collected.

The instructions suggested very definitely the directions to be used by the person giving the test, the time to be consumed by the pupils in taking the test, and how and when to distribute tests to the pupils, how and when to collect the test papers, and very specific instructions for scoring them.

No attempt was made to dictate to these schools, how many of the tests each should give but suggestions were made as to the kind of tests to be given so as to secure uniformity and to make sure worth while tests would be given. Detailed instructions for giving and scoring the tests were sent to each school, in addition to those accompanying each printed test. The manner in which the tests were given, the time limits, and the general procedure in the administration of the tests were thereby made uniform.

The schools participating in the above mentioned cooperative study did so in response to circular letters to the superintendents of those schools, inviting them to participate in the above study. Some of the schools to which the tests were sent did not participate in giving all of the tests. This fact accounts for the varying number of scores in the tabulations which follow.

This study would not have been feasible for the author, had not the scores been made available by the Research Bureau of the University of Kansas. A tabula-

tion of the scores in reading and composition by grades, to indicate the standing of the pupils by grades and to show a comparison by grades for first and second class cities is given

Composition Scores.

Table II.

Comp. Scores	Second Class Cities				Third Class Cities			
	IX	X	XI	XII	IX	X	XI	XII
1.1								
1.9	3	1			2			
2.8	51	51			14	3		
3.8	99	66	23	4	54	20	9	8
5	214	139	121	42	65	70	43	12
6	172	171	173	84	37	53	46	27
7.2	62	70	108	42	4	17	14	9
8	3	5	18	16				
9	1		2	1				
Totals	632	457	455	229	176	163	112	57

Analysis of the content of this table shows that in second class cities 37% of pupils in the ninth grade reached or exceeded the norm, (5.8).

16% of tenth grade reached or exceeded the norm, (6.5).

28% of eleventh " " " " " , (7.0).

25% of twelfth " " " " " , (7.4).

Third Class Cities.

23% of ninth grade reached or exceeded the norm, (5.8).

10% of tenth " " " " " , (6.4).

12% of eleventh " " " " " , (7.0).

16% of twelfth " " " " " , (7.4).

The medians are as follows:

Second Class Cities.

Ninth grade, 5.7.

Tenth " , 5.7

Eleventh " , 6.

Twelfth " , 6.8

Third Class Cities.

Ninth grade, 5.2

Tenth " , 5.8

Eleventh " , 6.

Twelfth " , 6.3

The table as a whole shows that children in Kansas cities are not up to the norms established by this test and that children in these second class cities made higher scores than did those in third class cities.

A comparison is made here of the scores of pupils in reading in second class cities with those in third class cities.

Table III. Thorndike-McCall Reading Scores.

Second Class Cities.					Third Class Cities.			
Reading Scores	IX	X	XI	XII	IX	X	XI	XII
34	1	1		1				
37	4	1			4	3	1	
40	4	4	1		4	4		
43	12	5			11	8	2	
46	29	12	5	2	12	7	5	3
49	33	16	2	6	44	26	17	7
52	59	49	27	11	33	21	7	8
55	46	39	19	6	66	42	19	19
58	117	103	62	38	36	30	31	20
61	86	77	57	50	27	21	25	19
64	71	92	59	40	22	26	23	17
67	13	2	7	5	16	13	24	17
70	59	73	90	55	18	1	3	
73	58	55	54	43	3	12	12	16
76	24	34	55	29		11	9	5
79	7	19	27	25			4	6
	<u>623</u>	<u>582</u>	<u>465</u>	<u>311</u>	<u>296</u>	<u>225</u>	<u>182</u>	<u>137</u>

Table III shows that 50% and in some grades more reached or exceeded the norm in reading and that 60% or more did not reach the norm in third class cities.

In Second Class Cities:

51% of pupils in ninth grade reached or exceeded the norm, (61).
 47% " " " tenth " " " " " , (64).
 62% " " " eleventh " " " " " , (64.5).
 50% " " " twelfth " " " " " , (67).

In Third Class Cities:

29% of the ninth grade reached or exceeded the norm, (61).
 37% " " " tenth " " " " " , (64).
 41% " " " eleventh " " " " " , (64.5).
 31% " " " twelfth " " " " " , (67).

The medians scores made on Thorndike-McCall Reading are as follows:

In Second Class Cities.	In Third Class Cities.
Ninth grade, 61.2	Ninth grade, 55.6
Tenth " , 63.2	Tenth " , 58.
Eleventh " , 64.4	Eleventh " , 61.3
Twelfth " , 67.3	Twelfth " , 61.6

It is thought the above tables are pertinent to this study because of questions that might arise regarding selection of pupils.

The scores of each phase of English were correlated with each other phase of English.

The Pearson Product Moment formula was employed for finding the correlation.

The correlation formula used is as follows:

$$r = \frac{\sum x'y' \cdot cy \cdot cx}{\sqrt{\sum x^2} \cdot \sqrt{\sum y^2}}$$

The following formula for finding the probable error was applied: $PE = .6745 \cdot \frac{1-r^2}{\sqrt{N}}$ to show the reliability of each coefficient.

After finding the coefficients of correlation in the above manner an attempt was made to show in diagram form, the measures in the scatter diagram. Indicating them on the diagram by lines showing approximately where the quartile divisions came.

Samples of the diagrams used in making the correlations, divided so as to show the quartile divisions of each series of scores, are included on pages 13-14-15, so that the reader may see the general relationship that is indicated.

These diagrams show that some pupils who excell in achievement in one phase of English sometimes achieve very little in another phase, this may indicate the need for remedial measures. It is suggested that a flexible classification be considered as a remedial measure for this difficulty because it would provide opportunity for individual instruction.

Table IV.

Correlation between English Literature Scores and Thorndike-McCall Reading Scores.

Lit. Score	Read. Score	Reading									
		37- 39.99	43- 48.99	49- 54.99	55- 60.99	61- 66.99	67- 72.99	73- 78.99	79- 84.99	85- 87.99	
1- 9.99		3	2	9	10	4		1			29
10- 19.99		3	2	14	35	17	9	2			82
20- 29.99		1	3	18	23	23	9	5			82 $q_1 = 21.4$
30- 39.99			2	11	18	24	13	11			79
40- 49.99	1			3	13	25	8	8			58
50- 59.99			2	2	3	11	6	8	3		35
60- 69.99					6	9	5	5	3		28 $q_3 = 62$
70- 79.99				2	5	7	4	14	4		36
80- 89.99				1	1	2	3	10	1		18
90- 99.99					2	6	2	7	4		21
100- 109.99					1	3	1	5	2		12
110- 119.99					1	3	2	2	1		9
120- 129.99							1		2	1	4
		8	11	50	118	144	63	78	20	1	493

$$r = .435 \pm .024$$

Table V.

Correlation between Terman Mental Age scores and Ayres

Spelling Scores.

M.A. Score	Spelling Score	Spelling															
		1- 2.99	3- 4.99	5- 6.99	7- 8.99	9- 10.99	11- 12.99	13- 14.99	15- 16.99	17- 18.99	19- 20.99	21- 22.99	23- 24.99	25- 26.99	27- 28.99		
56- 67.99	56	1	6	4	3	5	4	4	4	2	1	1					34
68- 79.99	68		12	10	2	4	1	4	3	4	4	1					45
80- 91.99	80	3	9	6	9	13	8	9	7	6	3	4	3	4	1		85
92- 103.99	92	5	7	11	11	11	15	15	12	6	6	2	8	4	1	114	91 = 101.1
104- 115.99	104	2	5	9	11	14	22	14	18	15	8	9	7	4			136
116- 127.99	116	1	5	6	12	11	11	14	16	13	18	9	6				122
128- 139.99	128	2	1	3	9	9	10	22	12	14	12	11	7	4	1	117	
140- 151.99	140	1	2	6	4	3	11	7	8	12	12	10	14	7	7	101	93 = 151
152- 163.99	152		1	1	2	5	9	13	14	8	10	13	12	4	2	94	
164- 175.99	164				2	2	8	7	6	12	6	7	11	5	1	67	
176- 187.99	176			3	1	4	3	2	4	7	6	10	10	4	2	56	
188- 199.99	188					1	2		2		2	4	6	4		21	
200- 210.99	200								2		1	2	3			8	
211- 221.99	211															1002	
		15	48	59	66	82	104	111	108	99	88	83	87	40	12		

$$r = .379 \pm .018$$

Table VI.

Correlation between Terman Mental Age Scores and English Literature Scores.

Literature Scores.															
Literature															
M.A. Lit Score	1	10	20	30	40	50	60	70	80	90	100	110	120	130	
56 67.99	9.99	19.99	29.99	39.99	49.99	59.99	69.99	79.99	89.99	99.99	109.99	119.99	129.99	139.99	
68 79.99	10	17	4	6		1			1					39	
80 91.99	5	12	8	9	6									40	
92 103.99	6	6	16	5	7	3	3							46 9, 88.9	
104 115.99	2	9	10	19	11	5	3	4	1		1			65	
116 127.99	1	9	10	16	11	8	4	13	3	2				78	
128 139.99	1	5	3	8	4	5	4	3	3	1				37	
140 151.99		2	4	6	11	3	2	3	7	3	2	2	1	46 93 136.2	
152 163.99		2	1	3	5	2	7	7	5	4	3			39	
164 175.99			1	1	3	4	1	4	2	1	2	4	2	25	
176 187.99			3		1	1	1	3	2	3		4	1	18	
188 199.99							2		1	5			1	4	13
							1				1			2	
	25	62	60	73	95	32	28	34	25	21	9	11	5	4	448

r .71

PE .015

Note: (It was thought best to include a part of the diagrams ~~that show~~ in the appendix, to verify that the ones shown on pages 13-14-15 are typical of the whole group).

Some Kansas schools are attempting to solve the above problem by sectioning the classes in English. This however cannot solve the whole problem for the reason that if a class in English were sectioned according to literature it would not necessarily be sectioned according to grammar, or the other phases of English. The above fact is shown on the diagrams on pages 13-14-15 of this study by scores in the lower left hand sections and by scores in the upper right hand section.. These scores show that the pupils making them have done well in one phase of English but poorly in the other phase of English.

The tables and diagrams in this study seem to indicate that pupils in an English class cannot be sectioned according to any one phase of the subject and thereby be properly sectioned according to other phases of the same subject.

These facts have been pointed out in order to show the situation revealed by the tables on pages 13-14-15 of this study when the scatter of scores is as great and

1. Topeka, Lawrence, and Kansas City.

varied as it is in these tables. These correlations were made also in order to show whether coefficients of correlation may well be used for prediction purposes in classification. However in the light of criteria set up by Rugg, McCall, and Hull and Limp for the interpretation of coefficients of correlation; coefficients ranging from .23 to .71 as these do are considered low to medium, hence for purposes of prediction according to hull and Limp they are useless. "Coefficients of .87 give 50% efficiency of prediction and .80 give 40% efficiency of prediction."

Reading McCall's statement, "Mental age is the best single measure of classification," raised the question: "Will mental age scores correlated with scores on the phases of English give reliable means of classification?" To answer this question mental test scores were secured and correlated with the scores in each of the phases of English. The correlation tables are shown in the appendix of this study. The Terman Group Mental Test was given and scored by the same persons who gave the other tests used in this study. It was given during the school year of 1923-24 to the same pupils to whom the other

1. Rugg, H. O. "Measurement of Relationship." pp. 271-283. Statistical Methods in Education. Houghton Mifflin Co.
2. McCall, W. A. "Determination of Reliability, Objectivity, and Norms." pp. 310-315. McMillan Co.
33. Hull, Clark L. and Limp, Charles E. "The Differentiation of the Aptitudes of an Individual by Means of Test Batteries." Journal of Educational Psychology. Feb., 1925.
4. McCall, W.A. "Relationship Measures" in How to Measure in Education. pp. 388-410. McMillan Co.

tests were given. A summation table of the coefficients obtained by correlating mental scores with each of the other phases is presented on page 17 of this study.

For the purposes of analysis a summation table was made showing the coefficients of correlation by phases of English indicating the coefficients for the ninth grade correlations separate from those of grades ten, eleven, and twelve. Therefore it did not seem necessary to include all of the scatter diagrams in the body of this study. They are included in the appendix.

The summation table on page 17 of this study shows that mental age scores correlate positively and from .38 to .71 with the scores on the phases of English. This is higher than any one of the phases correlated with the other phases. The P.E. in each correlation indicates that the number of scores has been sufficient to yield reliable coefficients.

Table VII.

Summation table showing the correlation coefficients of each phase of English with each of the other phases of English and with mental age, (grades ten, eleven, and twelve).

	Read- ing	Compo- sition	Spell- ing	Liter- ature	Vocab- ulary	Gram- mar
Mental Age	.60	.504	.379	.71	.467	.54
Reading	.391	.391	.235	.435	.497	.535
Composition	.391		.302	.418	.359	.729
Spelling	.235	.302		.431	.454	.49
Literature	.435	.418	.431			
Vocabulary	.497	.359	.45			.491
Grammar	.535	.729	.49		.491	

Note: (Some of the coefficients are not given in the table because the scores were not available).

This table shows that mental age scores correlate positively and from .38 to .71 with the phases of English. This is higher than any one of the phases correlate with the other phases, though the number of scores have been sufficient in each case to give a reliable coefficients.

The coefficients are all positive and from .23 to .71. According to the interpretation of coefficients given by H. O. Rugg and Hull and Limp vary from low to marked. In fact, Hull and Limp would interpret them as being useless for prediction purposes. Seemingly the

1. Rugg, H. O. "Statistical Methods Applied to Education." pp. 271-283.
2. McCall, W. A. "How to Measure in Education." pp. 310-315.
3. Hull and Limp. "Journal of Educational Psychology." Feb. 1925.

most worth while conclusion that may be drawn from the analysis of the above table and previous tables, is that there must be a multiclassification within the group enrolled in English classes, if the individuals within the group are to be well provided for. The pupils in the English classes should be divided into groups according to their performance in each of the phases of English if grouping is employed, and the instruction adapted to their needs so as to overcome the special difficulties of each individual within the group.

Table VIII.

Summation table showing the correlation coefficients of each phase of English with each of the other phases of English in grade nine.

	Read- ing	Compo- sition	Spell- ing	Liter- ature	Vocab- ulary	Gram- mar
Vocabulary	.49	.35	.69			
Grammar	.33	.41				
Literature	.44	.20				
Reading		.39		.44	.51	.33
Spelling		.19			.69	
Composition	.39		.19	.20	.35	.41

Note: (Some of the coefficients are not given because the scores were not available).

In analysis of this table it is noted the coefficients are all positive and from .19 to .69, showing that the interrelation is varied.

The analysis of these tables show agreement with W. W. Charter's statement, "Correlation between intelligence rankings and school marks are not high enough to be considered more than "prema facia" evidence. The coefficients run from plus .40 to plus .60. This means that there is a slight tendency for bright students to make high grades in class, and it means nothing more."

It is noted from the facts shown by the summation table on page 18 that the answer to the question, "Will mental age scores correlated with scores on the phases of English give a reliable means of classification?" is answered in the negative.

The conclusion that is drawn from the foregoing analysis is that no phase of English or mental age can be used as a complete index of performance in English and therefore, cannot be a wholly reliable means of classification. Because the foregoing analysis has led to this conclusion, an attempt to find out whether one of the phasis of English or mental age combined with two of the other phases of English will give a reliable basis for prediction of performances on the whole subject of English. The Otis multiple correlation formula was used to try to find a better means of prediction of performance in the phases of English. The formula is as follows:

$$R_{c_2} = \frac{\sqrt{r_{c_1} + r_{c_2} - 2 \times r_{c_1} \times r_{c_2} \times r_{r_2}}}{1 - r_{r_2}}$$

The function of this process is, to obtain a better means

1. Charter, W. W.--"Success, Personality, Intelligence"
"Journal of Educational Research" Mar. 1925 pp.169-170

of prediction of performance by comparing the sum of two or more variables with an arbitrarily chosen criterion. The criterion used in this illustration was reading score.

The procedure is as follows: Using the previously computed coefficients, $r = .39$ between reading and composition; $r = .23$ between reading and spelling; $r = .30$ between composition and spelling. Substituting in the given formula.

$$R_{cd} = \sqrt{\frac{.39^2 + .23^2 - 2 \times .39 \times .23 \times .30}{1 - .30^2}}$$

$$= \sqrt{\frac{.15 + .05 - .05}{1 - .09}}$$

$$= .40$$

The multiple-correlation coefficient increases to .40 from the above considered coefficients, but according to the previously mentioned criteria for interpreting coefficients, as set up by Rugg, and by Hull & Limp, the coefficient is still too low to be of any value for purposes of prediction.

It is thought that since no wholly reliable means of predicting performance has been found in this investigation, that a multiclassification of pupils enrolled in the classes of English is the solution to the problem of classification. In other words when there are pupils who are having a special difficulty with spelling or literature, they will at once be placed in a group where they will receive special instruction in these phases until their special difficulties are overcome or if perchance the pupils were in a small school, remedial

1. Otis A. S. "Statistical Method in Education Measurement." pp. 240-41 World Book Co.

treatment might demand nearly all of the attention of the instructor. However, that might be, it seems that since folks must do their own reacting in order to learn, that next to adequate assignments for all pupils, remedial treatment for the correcting of wrong reactions is next in importance.

Perhaps a part of the room could be designated in which the pupils needing assistance in spelling, reading, sentence structure or what not, could assemble for remedial suggestions. Multiclassification, should be a most effective way of taking care of special difficulties because the proper treatment could be given when the interest and attention of the pupils were at their height. Hence it seems the solution to the problem is multi-classification in the regular classes for the purpose of caring for the special difficulties of the individuals in the regular classes. By this plan pupils may be transferred from group to group as a special difficulty becomes apparent, remaining in each group only until the difficulty is overcome and regular progress can be made. By this plan the subject of English as a whole is treated in a similar way.

Arthur I. Gates, suggests this sort of a classification for other subjects. He says, "This procedure should prove wholesome and democratic in its influence. Membership not only in one group ~~is~~, as often happens for several years of the grammar

1. Gates, Arthur I. "The Nature and Educational Significance of Physical Status and of Mental, Physiological, Social and Emotional Maturity."
"Journal of Educational Psychology." Sept., 1924.

school career, but with many groups would perhaps tend to reduce clannishness, broaden friendships, enrich experience, and build a finer foundation for effective participation in the many sided activities with all varieties of people which life in a democracy demands."

This plan permits the application of remedial measures to each individual difficulty and affords opportunity for individual instruction of these pupils.

There are a great many plans for the giving of individual instruction suggested in the "Twenty-Fourth Yearbook of the National Educational Association."

Summary and Conclusions.

1. This study attempts to find a solution for the problem of classification of pupils who enroll in classes of English in the high school, by investigating the interrelation between the various phases of English as judged by test results in some high schools of Kansas. The high school grades, ten, eleven, and twelve are included in this investigation.
2. The study is based upon standard achievement and mental test results in reading, vocabulary, spelling, composition, literature, and grammar for 1477 pupils enrolled in High Schools in 14 different counties of the state.
3. Correlations were made between the scores on each of the phases with each of the other phases of English.
4. The coefficients from these correlations were found to be low as far as the value for prediction purposes were concerned, however, the coefficients were positive in each correlation.
5. Correlations were made between M. A. scores and scores on each phase of English. The results of these correlations show higher coefficients than the correlations between the phases of English, but according to the criteria used for interpreting coefficients they also were of little value for prediction purposes.
6. The probable error was computed for each correlation to show the reliability of the coefficient.

7. A summary was made of the coefficients by single phases of English and analyzed to show single relationship. Multiple Correlation was used to show the interrelation more completely.
8. A total summary of all the coefficients was made and analyzed in attempt to show the interrelation.
9. Suggestions were made on the basis of this analysis, for the classification of pupils in the English classes of the senior high schools.
10. The suggestion made is multi-classification within the subject of English on the basis of achievement in each of the phases of English.

Table VII -

Correlation between Thorndike McCall Reading scores and
Thorndike Vocabulary Scores. Grades X - XI - XII.

Vocabulary

Reading Score	Voc. Score	4	5	6	7	8	9	10	10.5	
		4.99	5.99	6.99	7.99	8.99	9.99	10.		
37 39.99	2									2
40 42.99	1	2								3
43 45.99	3			1	6	6				16
46 48.99	3			3	4	3	1	1		16
49 51.99	2			2	8	9	2			30
52 54.99				7	3	22	6	1		38
55 57.99					8	10	16	7		41
58 60.99	1	5			9	20	27	28		90
61 63.99				5	3	11	9	16		44
64 66.99					4	2	9	5		20
67 69.99						8	5	11		24
70 72.99						2	4	7		13
73 75.99					2	2		5		9
76 78.99							1	11		12
79 81.99								3		3
		12	7	18	47	94	87	96		361

Grades X - XI - XII. $r = .49 \pm .008$

Table VIII

Correlation between Thorndike Vocabulary and Hillegas
Composition. Scores in Grades X-XI-XII.

Composition

Vocabulary	Voc. Score	Comp. Score	1.1	1.9	2.8	3.8	5	6	7.2	8	9
	4	4.99			3	4	7	1			15
	5				1	6	9	2			18
	6		1		1	13	22	9			46
	7				1	34	35	24	1		85
	8				1	16	41	39	23	2	122
	9				1	18	37	68	15		139
	10					18	53	72	16	1	160
			1	8		199	184	215	55	3	585

Grades X-XI-XII. $r = .359 \pm .043$

Table IX

Correlation between Emporia Literature and Hillegas
Composition Scores. Grades X - XI - XII.

Lit. Score	Comp. Score	Composition						
		1.1	1.9	2.8	3.8	5	6	7.2 8
1	9.99			7	35	26	10	1 79
10	19.99		1	12	71	42	36	5 167
20	29.99		1	4	64	50	33	4 156
30	39.99			5	58	38	24	13 128
40	49.99				29	27	24	8 87
50	59.99			7	22	14	3	2 48
60	69.99			5	11	17	1	34
70	79.99			4	12	10	6	1 35
80	89.99			3	6	12	4	25
90	99.99			4	2	10	5	1 21
100	109.99			1	7	8	2	18
110	119.99					2	4	6
120	129.99			1	1	1	3	6
130	139.99				1	1		1 3
140	149.99						2	2
		2	29	280	240	197	57	804

Grades X - XI - XII, $r = .418 \pm .024$

Table X.

Correlation between Emporia Literature Scores and Thorndike McCall Reading Scores. Grades X - XI - XII.

Lit. Score	Reading									
	37 42.99	43 48.99	49 54.99	55 60.99	61 66.99	67 72.99	73 78.99	79 84.99	85 90.99	
1 9.99	7	4	16	20	6	1	1	1		57
10 19.99	4	5	28	69	37	17	4		1	165
20 29.99	3	7	24	45	53	15	9		1	157
30 39.99		4	17	38	46	20	20			145
40 49.99	1		7	20	38	13	13			82
50 59.99		2	3	5	15	9	13	4		51
60 69.99				7	11	7	7	4		34
70 79.99			3	6	8	4	20	6		47
80 89.99			1	2	2	3	13	1		22
90 99.99				2	6	2	9	4		23
100 109.99				1	3	1	5	2		12
110 119.99				1	3	2	2	1		9
120 129.99						1		2	1	4
	15	22	89	98	238	95	116	24	3	493

Grades X - XI - XII. $r = .435 \pm .024$

Table XI.

Correlation between Thorndike-McCall Reading scores and
Charter's Grammar scores. Grades X - XI - XII.

		Grammar										
		1	5	9	13	17	21	25	29	33	37	
Read. Score	Gram. Score	4.99	8.99	12.99	16.99	20.99	24.99	28.99	32.99	36.99	40.99	
34	39.99	2			2						4	
40	43.99	1	1	4	4	1	3	1			14	
46	51.99	1		6	4	6	8	5	8	2	41	
52	57.99	5	6	18	14	14	10	6	9		82	
58	63.99	2	9	12	9	19	15	15	10	5	118	
64	69.99	5	12	8	7	9	11	11	10	1	64	
70	73.99				3	3	7	6	8	10	1	38
76	81.99						2	3	2	3	2	14
82	87.99										1	1
		6	15	26	31	33	34	34	33	30	5	375

Grades X - XI - XII. $r = .53 \pm .02$

Table XII.

Correlation between Terman Mental Age Scores and Thorndike.
Grades X-XI-XII.

Vocabulary scores.

Vocabulary.

MA. Score	> 3-4- 3.99	5- 5.99	6- 6.99	7- 7.99	8- 8.99	9- 9.99	10- 10.99	10.5
56- 67.99	1	1	3	4	4			13
68- 74.99			4	10	2	3	1	20
80- 91.99		3	9	10	15	13	2	52
92- 103.99	2	2	5	17	17	10	7	60
104- 115.99		1	5	8	12	22	16	64
116- 127.99			1	13	9	25	23	71
128- 139.99		1	2	7	13	25	22	70
140- 151.99				2	10	15	29	56
152- 163.99	2				3	21	30	56
164- 175.99					1	5	24	30
176- 187.99						2	16	18
188- 199.99				1	2		12	15
200- 211.99					1		3	4
	5	8	29	72	89	141	185	529

Grades X-XI-XII. $r = .467 \pm .006$

Table XIII.

Correlation between Terman Scores and Charters Grammar Scores.

M.A. Score	Grammar Score	Grammar									
		1 4.99	5 8.99	9 12.99	13 16.99	17 20.99	21 24.99	25 28.99	29 32.99	33 36.99	37 40.99
56											
67.99	56	1	2	1	4	1	1	1			11
68											
79.99	68	2	1	3	1	5	1		1		14
80											
91.99	80	2	4	7	9	1	1	1			25
92											
103.99	92	3	7	7	6	6	4	5	2		41
104											
115.99	104	2	3	5	9	9	6	8	5	1	48
116											
127.99	116	1	2	6	3	10	10	9	7	2	50
128											
139.99	128		3	3	7	9	8	13	8	5	57
140											
151.99	140		2		5	8	7	8	10	10	51
152											
163.99	152		1		4	6	3	1	5	8	41
164											
175.99	164				2		3	1	5	8	20
176											
187.99	176		1				3	1	5	6	18
188											
199.99	188						1	1		4	9
200											
211.99	200										3
											3
		12	24	33	51	59	46	54	54	47	388

Grades X—XI—XII. $r = .54 \pm .024$

Table X/V

Correlation between Thorndike McCall Reading and
Hillegas Composition Scores. Grade IX

	Composition								
	1.1	1.9	2.8	3.8	5	6	7.2	8	9
Read. Score									
31-									
33.99									
34-					1				1
36.99									
37-				1		1			2
39.99									
40-			1				1		2
42.99									
43-				1					1
45.99									
46-			4	4	4	1		1	14
48.99									
49-			1	1	7	1			10
51.99									
52-			4	4	8	9			25
54.99									
55-				5	10	7	2		24
57.99									
58-			3	12	18	12	7	1	53
60.99									
61-			5	5	13	16	6		45
63.99									
64-				2	10	11	13		36
66.99									
67-				1	2		1		4
69.99									
70-			1	4	9	10	6	1	31
72.99									
73-				3	6	13	8	1	31
75.99									
76-				1	4	5	7		17
78.99									
79-						1	1		1
81.99									3
82-									
84.99									
85-									
87.99			19	44	92	87	52	4	1
									299

$$r = .39 \pm .023$$

Table XV.

Correlation between Charter's Diagnostic Grammar Test
and Buckingham-Ayres Vocabulary Test. Grade IX

Gram. Score	Vocabulary						
	4- 4.99	5- 5.99	6- 6.99	7- 7.99	8- 8.99	9- 9.99	10 10.99
5- 4.99	3		4	2	1	1	11
5- 6.99	1	1	4		2	1	9
7- 8.99	2	3	4	5	2	1	19
9- 10.99	3	1	5	1	3	2	15
11- 12.99			2	3	3	2	11
13- 14.99	1		1	7	1	3	14
15- 16.99				1	1	1	4
17- 18.99			4	3	3	2	15
19- 20.99		1		3	4		12
21- 22.99	1			3	2	4	12
23- 24.99			2	2	4	1	11
25- 26.99			3		2	4	10
27- 28.99				1	1	1	6
29- 30.99	1			3		2	10
31- 32.99				2	1	1	8
33- 34.99					1	2	6
35- 36.99						1	2
37- 38.99							1
	12	6	29	36	31	29	33
							176

$$r = .491 \pm .008$$

Table XVI

Correlation between Thorndike-McCall Reading and
Charter's Diagnostic Grammar Scores. Grade IX

Grammar

Reading	Gram. Score	5- 8.99	9- 12.99	13- 16.99	17- 20.99	21- 24.99	25- 28.99	29- 32.99	33- 36.99	37- 41.99	
34- 39.99	1										1
40- 45.99		1	2	2		1					6
46- 51.99	1		4	1	4	3	2	3			18
52- 57.99	3	3	6	4	3	3	3	3			32
58- 63.99	1	2	4	2	3	4	3	10	5		36
64- 70.99		4	1	1	6	2	1	7	3		26
70- 75.99				1	1	1	1	2	1		7
76- 81.99			1			1			1	1	4
82- 87.99							1				1
	6	15	26	31	33	34	34	35	30	3	151

$$r = 33 \pm .05$$

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